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ABSTRACT

This paper describes and analyzes population trends in countries in the Caribbean which were British colonies before the move to independence. It begins by examining past trends in each of the major components of population change, mortality, fertility, and international migration. Following this is a summary of the assumptions that have been used in recent population projections and the base data they have utilized. The projections of the total population of each country of the region, and of the region as a whole, are given, along with the age-sex breakdown of the projected populations and the implications for school enrollment, manpower, and dependency. (The projections considered are two sets prepared by the United Nations, and one set published by the Population Reference Bureau.) Next, the paper offers a summary of information, derived from recent in-depth analyses, of trends and patterns in fertility. And finally, there is a discussion of the needs of the expected increased population for an equivalent total food supply. (KH)

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CONFERENCE ON

NEW PERSPECTIVES ON CARIBBEAN STUDIES: TOWARDS THE 21ST CENTURY

POPULATION PERSPECTIVES OF THE COMMONWEALTH CARIBBEAN

By

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CONFERENCE ON

NEW PERSPECTIVES ON CARIBBEAN STUDIES: TOWARDS THE 21ST CENTURY

POPULATION PERSPECTIVES OF THE COMMONWEALTH CARIBBEAN

Jack Harewood

Introduction

This paper deals with the Commonwealth Caribbean, that is Countries in the Caribbean which were all British Colonies until the move to separate independence began two-and-a-half decades ago. It includes 14 islands or island groups and two mainland territories as follows: Jamaica, Trinidad and Tobago, Barbados, the Bahamas, the Windward Islands: Dominica, Grenada, St. Lucia, St. Vincent; the Leeward Islands: Antigua, the British Virgin Islands, Montserrat and St. Kitts/Nevis; the Cayman Islands, the Turks and Caicos Islands, Guyana and Belize.

Our principal concern, in an investigation of population perspectives in a conference looking forward to the 21st century is, of course, population projections to the year 2000 and beyond. The method that is most commonly used by demographers in making projections is the *component* method which considers, and makes explicit assumptions about the future trends in each of the major components of population change - mortality, fertility and international migration.

The paper begins, therefore, with a discussion of past trends in each of the components of change. Next there is a summary of the assumptions that have been used in recent population projections and the base data they have utilized. The Projections of the total population of each country of the Region and of the Region as a whole are given, along with the age-sex break-down of the projected populations and the implications for school enrolment, manpower and dependency. The projections considered here are two sets prepared by the United Nations: UN (1982) and UN (forthcoming), and one set published by the Population Reference Bureau, Bouvier (1983 and 1984).

We conclude with some further discussion of trends and patterns in fertility based on recent in-depth analysis of this component of change.

Past and Future Trends in Mortality, Fertility and Migration

Mortality

The average length of life of Caribbean populations according to life tables for the 3-year intervals centered on the censuses of population from the late 19th century, show little improvement in mortality up to the census of 1921. Indeed, in Jamaica the average length of life was about 1 year less in 1921 than it was in 1881. In Trinidad and Tobago there was a small improve-

ment of about 4 years between 1891 and 1921 while in Guyana, which in 1891 had a very much lower average length of life, there was an increase of 5-6 years.

After 1921, mortality improved very rapidly in all countries. In Jamaica, for example the average length of life of males increased from 36 years in 1921 to 51 years in 1946, and in Trinidad and Tobago the increase for females was from 40 to 56 years in the same short period. This rapid improvement continued until 1960, the average length of life increasing by about 10 years for both males and females in Trinidad and Tobago in the first post-war inter-censal period 1946-1960, with equally impressive improvements in the other countries. As a result of this rapid improvement, the average length of life in the Caribbean was fast approaching that of more advanced countries. For example, life expectancy at birth in Barbados was about 12 years less than that of the U.K. in 1950; 10 years later it was only 5 years less than the U.K's.

It was to be expected that there would be a decline in the rate of decline in the death rates and this occurred after 1960. Thus, as compared with an increase of about 7 years in life expectancy in the period 1950-1960 in the following decade the increase was only about 3 years for most countries of the Region. This reduced rate of improvement applied to all age groups, but especially to persons 5 years and older. Indeed, the infant mortality rate has improved substantially since World War II. In Barbados, which had the highest IMR in 1950 and experienced the most rapid decline thereafter,

the rate fell from 130 in 1950 to about 35 in 1970. The IMR of the other countries was about 40 in 1970. Here again the decline has been very rapid as compared with the developed countries but there is still room for appreciable improvement. In 1970 the IMR in the Caribbean was more than twice that of the U.K.

On the whole, however, it now appears that it is the young adult population (aged 15-54 years say) that needs particular attention in view of the high rates of death from accidents and from diabetes, cancer and other degenerative diseases. With the population now aging this could become of increasing importance.

The rapid decline in mortality rates between the two World Wars is seen as the cumulative effect of a variety of measures taken over a long period of six decades or more rather than the outcome of specific revolutionary action taken at that time. These included measures to improve public health, sanitation, housing and medical facilities as well as some action towards reducing the incidence of some important diseases such as malaria, hookworm, tuberculosis and diarrhoea.

In the post-World War II period, when the decline in the death rates was even more rapid up to 1960, this improvement is believed to be much more closely associated with the control of a few important diseases of which the most important was malaria, but also including a much more effective control of the other diseases mentioned earlier than had been achieved before. It

is worthy of notice that this improvement in the mortality situation in the Caribbean as in many other developing countries was not the result of social and economic development in the countries themselves as was the case when the developed countries experienced their improvement. Instead it is the direct result of the introduction of 'wonder' drugs such as penicillin and the sulpha drugs and, more especially, of the 'wonder' insecticide DDT which led to the control of malaria, all developed in the advanced countries and made available free or at little cost to poorer countries.

The slowing up of the rate of decline in 1960 must in large part largely reflect the high life expectancy which the Region has now achieved. At the same time many of the countries, because of economic and financial problems or problems of management have been experiencing set-backs in public health and in the provision of health services. While the degenerative diseases are now the major causes of death and these cannot be controlled as quickly as the infectious diseases were, it seems likely that there is still room for improvement through better social, economic and environmental conditions.

The recent trends suggest that life expectancy will continue to increase but at a gradually decreasing rate, and that the rate of increase will be somewhat larger for those countries which currently have a lower life expectancy.

Fertility

Fertility which increased in the 19th century after emancipation did not reach a very high level in the Caribbean, the CBR not much exceeding 35 per thousand in most countries. Later in the century the imbalance in the sexes resulting from the large-scale emigration of males led to some decline in fertility.

At the time of the census of 1921 the joint gross reproduction rate (GRR) was between 2.6 and 3.0 for all countries except Guyana and Trinidad and Tobago. In these two countries where indentured immigration was very important up to World War I and again there was an imbalance of the sexes - this time a large surplus of males - the joint GRR was only 2.0. In the period from 1921 to the end of World War II, the GRR increased for the two last-mentioned countries but fell slightly for Jamaica and Barbados and changed little for the other countries. The increase in Guyana and Trinidad and Tobago is considered to be largely the result of the stabilising of family life and the improvement in the sex ratio of Indians following the end of indentured immigration in 1917. This led to the fertility of this ethnic group being much higher than that of non-Indians and it has remained higher up to the present time though the differential has reduced appreciably in the recent past.

Between 1946 and 1960 there was a notable increase in the GRR for all countries, the increase being lowest for Barbados and to a lesser extent for Trinidad and Tobago. By 1960 the GRR was 2.6 for Barbados, 2.8-3.0 for Trinidad and Tobago and Antigua, and between 3.5 and 4.0 for most of the other

countries. An improving sex balance made some contribution to this increase in some countries but also very important was increased fecundity following the control of diseases such as venereal disease and malaria, and the overall improvement in the health of the populations. The relatively small increase in Barbados heralds the successful control of fertility which that country has experienced following the introduction of its early and effective Government—supported family planning programme.

Since 1960 there has been a remarkable decline in fertility in all countries of the Region, though the period during which this decline has occurred has differed from country to country. Looking first at the CBRs, between 1960 and 1970 there was a decline of about one-third in Barbados, Trinidad and Tobago and Grenada and smaller declines in the other countries, with the notable exception of St. Lucia where there was no decline.

But in a number of countries, notably in Jamaica and to a lesser extent in Barbados, the decline in the CBR was the result of the heavy emigration this time of young women of child-bearing age. On the other hand, in the case of Trinidad and Tobago decline in the CBR reflected entirely a reduction in the fertility of women. Thus, the GRR for Jamaica in 1970 was the same as 10 years earlier - 2.7 for females, while in Trinidad and Tobago the female GRR fell from 2.7 in 1960 to 1.7 in 1970.

In the 1970s the fertility of all countries of the Region has declined, the decline being relatively larger for those countries where it started late. But for the period between the last two censuses, the annual

measures of fertility have been increasingly deflated by the over-estimate of mid-year population which has been used as the denominator in these measures. Similarly the rate of decline in fertility has been exaggerated for the same reason. Data from the 1980 censuses of population and the vital registration data around 1980 will soon provide a better indication of fertility trends since 1970.

For projecting the population to the year 2000 and beyond, it is necessary to make assumptions about whether the recent declines in current fertility mark a permanent downturn in fertility which will result in the Caribbean becoming one of the areas of low fertility in the near future. This certainly seems to be so in the case of Barbados. On the other hand, in some of the other countries, e.g. in Trinidad and Tobago, the CBR has ceased to decline though as we indicated earlier there is still some decline in GRRs.

Unlike mortality where improved public health, medical advances for the control of specific diseases and improving social and economic conditions can be expected to lead to further increases in life expectancy, there are many more factors which appear to affect fertility and the relationships are much more complex so that forecasting fertility trends is hazardous. For example, it has been shown that in the Caribbean as elsewhere, fertility is associated with many socio-economic and demographic factors including the level of education, urban-rural residence, religion, occupation and pattern of work of women and their partners and with the age at first union and at first birth,

the types of current and previous unions and the number of partners a woman has had. In addition to these and other social and economic factors, the availability and use of modern contraceptives are, of course, of critical importance. The forecasting of fertility trends is made difficult not only by the large number of factors known to affect fertility but by the fact that the relationship between many of these variables and fertility is not consistent for all countries or for all times.

Migration

International migration has been an important, often the most important component of population growth in the Caribbean. The modern population of the Region owes its origin to the large-scale immigration of workers to the sugar cane and other plantations. Until the third decade of the 19th century most of these immigrants were slaves, and thereafter, until the First World War, those countries which did not yet have an ample supply of cheap labour - particularly Guyana and Trinidad and Tobago - continued to receive large numbers of unfree (indentured) labour. In Trinidad (excluding Tobago) where immigration has been more important in recent times than other countries, despite its rapidly declining importance immigration accounted for two-thirds of total growth in the last decade of the last century and nearly one-half in the first decade of the present century.

On the other hand, excluding the more northerly small island groups - the Bahamas and the British Virgin Islands - and the continental Belize,

all countries of the Region except Trinidad and Tobago experienced appreciable net emigration for most of the time since around 1881. Jamaica, for which the most comprehensive data on migration are available for the period from the start of census-taking in the early 1840s, can be used as an example for the Region except those already mentioned and Guyana. There was a small net immigration into Jamaica up to the inter-censal period 1871-1881. Thereafter, however, emigration has increased rapidly from 24,800 in the decade 1881-1891 to 296,500 in 1960-1970. Expressed as a ratio to natural increase, emigration varied between 30 per cent in the inter-censal intervals 1881-1891 and 1943-1960 and 74 percent in 1911-1921 and was 55 percent in the decade 1960-1970. The only period in which there was a net immigration was 1921-1943.

In Trinidad and Tobago, at the other extreme, there was a large but declining net immigration, except in the decade 1911-1921, until 1960. Thereafter this country joined the others and in the inter-censal interval 1960-1970 lost 127,000 persons through net emigration, equivalent to 53 per cent of natural increase.

The large-scale emigration from the Caribbean in the period 1880-1920 was partly in response to depressed conditions in the Region, and partly in response to opportunities for large-scale emigration to North and Central America and to the less densely populated territories of the Caribbean in all of which there was greater economic opportunity. These opportunities arose with the construction of the Panama Canal, the development of banana plantations

in Central America, the expansion of the sugar industry in Cuba and the rapidly expanding economy of the United States of America. This emigration came to an end as a result of immigration restrictions introduced in the USA and elsewhere and with the economic depression starting in 1929 there was even some net return migration to the Caribbean.

There was some special migration to Trinidad and to the United States during World War II but the re-emergence of emigration as an important demographic factor did not occur again until after the War. Many of the West Indians who had joined the British fighting forces (mainly in the RAF) settled in Britain and these were soon joined by small numbers of persons going to the universities and other institutions of higher learning. Starting in the early 1950s, however, anincreasing number of West Indians migrated to Britain. Emigration from the Region in the 1950s totalled nearly 260,000, three-quarters of this from Jamaica. Trinidad and Tobago did not take part in this emigration. The British Virgin Islands and the Bahamas have continued to be receivers of net immigrants, the latter mainly from Haiti. A study of this new emigration from Jamaica to the U.K. found the following to be mainly responsible: the high unemployment rate in the Caribbean, the 'pull' of better economic conditions in the U.K., including the higher real wage and the comprehensive social security system, the availability of cheap transport facilities to the U.K. supported by the advertising campaigns of competing travel agencies, and the absence at that time of any restrictions on entry into the U.K. by persons from the British colonial territories. (Roberts and Mills (1958).

When this emigration was drastically curtailed with the passage of the 1962 Commonwealth Immigrants Act by the British parliament restricting entry into the U.K. from the West Indies and some other non-white colonies, there was a marked decline in emigration from the Region for a short while but, fortuitously there was soon a relaxing of restrictions of entry into the USA from the Caribbean countries which began becoming independent countries from around that time. Since then there has been very large-scale emigration to the USA and, to a lesser extent to Canada in which Trinidad and Tobago joined for the first time. For those countries which did not become independent at the time and hence did not benefit from the USA liberalising of entry tended to take advantage of opportunities to migrate to the US Virgin Islands and to a lesser extent to the British Virgin Islands. There was also a sizable migration to Trinidad from neighbouring smaller islands, so that the emigration from Trinidad and Tobago was a net movement.

Emigration from the Region in the 1960s was very much larger than in the 1950s, and is estimated, on the basis of balancing the census counts, at nearly 600,000, one-half from Jamaica and 1 in 5 from Trinidad and Tobago.

In the last inter-censal period 1970-1980, the indications are that emigration has been even larger than in the preceding - about 650,000. There has been some slight decrease from most countries but a very large increase from Guyana because of its special economic and related ills while, for the first time there has been a net emigration from the Bahamas. Of the emigrants about 42 percent were from Jamaica, 20 percent from Guyana and 14 percent from Trinidad and Tobago.

The indications are that as long as opportunities exist, large scale emigration from the Region will continue. The question is whether the opportunities will continue. Obviously future decisions about immigration to their countries by the governments of the USA and Canada will be based on a large variety of factors which affect their own national interest. Any meaningful assumptions about future Caribbean emigration must then be, in fact, assumptions about actions of these two (and other) governments about immigration generally and, perhaps, as in the case of the UK, West Indian immigration in particular.

But as Guengant (1984) points out it is not true that emigration from the Caribbean depends on possible outlets rather than local conditions, as "actual Caribbean migration movements have proved to be more complex and adaptive to changing conditions than expected". In this connection he draws particular attention to illegal immigration. There has bean, over the years, significant illegal immigration into the U.S.A., into the Bahamas (mainly from Haiti) and into Trinidad and Tobago (mainly from Grenada).

Population Growth

The net effect of these trends on the components of growth has been well documented. For the Region (excluding the Bahamas) population growth was negligible in the decade 1911-1921 (¼ per cent) and very high in the first post-war inter-censal period 1946-1960 (2¼ per cent). Since then the rate of growth has fallen and was about 0.9 per cent in the decade 1970-1980.

In the interval 1946-1960 only the tiny Montserrat and Turks & Caicos Islands was there negative growth. In all other countries the rate of growth was 1.3 per cent or higher, being highest - 3 per cent - in Guyana and Trinidad and Tobago. Since then the rate of growth has slowed in all countries except the Virgin Islands, the decline in the rate being especially large in 1970-1980. In this most recent inter-censal period there were still a number of countries, including Trinidad and Tobago, St. Lucia and St. Vincent, which had a growth rate of more than 1 per cent. Of the others, two countries had a growth rate of under ½ per cent and two had a population loss. Notable is the case of Barbados which increased by only 0.2 per cent in both inter-censal decades since 1960.

With the declining fertility and still high emigration, therefore, the rate of population growth is now considerably less than in the immediate post-World War II period when there was grave concern at the rapid growth.

Population Projections

The most recently published comprehensive set of population projections for all countries of the Caribbean is included in United Nations (1982) which gives estimates and projections for all countries of the world, as assessed in 1980. These have been revised and up-dated as at 1982, taking into account data from the 1980 censuses of population where available - United Nations (forthcoming). While the latter projections replace the former, we make some comparison of the data, assumptions and projections of the two sets to draw attention to some of the problems involved in projecting the population of the Region.

Recent population projections for some of the countries of the Commonwealth Caribbean have also been published by the Population Reference Bureau. These projections - Bouvier (1983 and 1984) include Antigua & Barbuda, Barbados, St. Lucia and St. Kitts/Nevis which are also discussed in this paper.

The Data

The base date for the United Nations (1982) projections is 1975, the official estimates of population for the Region being taken as the base population wherever these are available. These estimates are derived, with the notable exception of Trinidad and Tobago which is discussed below, by applying the official birth, death and migration statistics to the 1970 census population.

In general, in all countries of the Caribbean where emigration is important the official estimates of net emigration, derived as the net passenger movement according to the embarkation/disembarkation (E/D) cards, grossly under-estimates the real emigration. The reason for this appears to be that the immigration departments are more concerned with ensuring a proper record of arrivals than of departures. In any case, with the large increase in tourism and non-migratory travel, net movement is a negligible proportion of total passenger movement and a small error in either arrivals or departures could result in a considerable error in the estimated migration.

For this reason, the official mid-year figures invariably over-estimate the population and the error becomes cumulatively larger each successive year after the base census. As a result, at each successive census this century, in each of the countries of the Region with only two exceptions, the census count has been appreciably less than the expected population. The base populations (for mid-1975) in the UN (1982) projections are therefore all too high.

The situation is especially bad for Trinidad and Tobago. In that country there was a serious under-enumeration (probably about 5 per cent) at the 1970 census because of the social and political unrest at the time of the census enumeration. For this reason, the official mid-year estimates for the 1970s were derived as a continuation of the series based on the 1960 census, and hence the over-estimation as described above has been compounded over a much longer period.

The age-sex breakdown of the mid-year estimates is also unreliable because of the absence of reliable information about the break-down of emigrants.

This of course throws doubts on the age-specific measures of mortality and fertility that must be used in the projecting of the population.

As a result of these problems, the mid-1980 population as projected by UN (1982) is 4 per cent higher than the revised estimate for mid-1980 in UN (forthcoming). The age distribution in UN (forthcoming) also differs significantly from that of UN (1982). For those countries for which the 1980 census data were available, the mid-1980 population in UN (forthcoming) is based on the census count. Notable exceptions are Guyana where the census count was 760,000 but the mid-1980 estimate is 865,000, and Jamaica with a preliminary census count of 2,004,000 as against a UN mid-year estimate of 2,170,000.

The Bouvier projections use as their base population the 1980 census count for Barbados and St. Kitts/Nevis and the official estimate for St. Lucia and Antigua, this latter country not having taken a census in 1980.

Data on mortality and fertility are obtained from vital registration. Up to the 1960s the birth and death registration in the Region were considered complete and of good quality. Since then there appears to have been some slight deterioration in these data and certainly in most countries the series are not as up-to-date as they used to be. Nevertheless the data are generally considered to be good enough to be used with confidence.

The Assumptions

As UN (1982) points out, the assumptions used in the projections rest on the premise of orderly progress over the projection period. For countries of less than 300,000, which include many of the Caribbean countries, the component method of projection was not used; instead assumed rates of growth were used to project the total population of the country only. The report however contains projections for groups of these countries - the Windward Islands[1] and the Other Caribbean.[2]

The basic mortality assumption for the Commonwealth Caribbean is that life expectancy at birth will continue to increase slowly over the project period, but at a declining rate. For example, for the 40-year period 1980/85 to 2020/25 UN (forthcoming) assumed that male life expectancy in Barbados would increase by 3 years in the first 20 years and by 1.4 years in the second 20 years. In the same intervals the increases for females are 3.7 and 2.0 years respectively. The rates for the other countries, which in 1980 had slightly lower life expectancies than Barbados - e.g. e_x^0 for Trinidad & Tobago males in 1980/85 is 67.8 years as against 68.9 for Barbados - life expectancy is assumed to increase slightly more rapidly so that by 2025 life expectancy would be about the same for all countries of the Region.

For projecting the population, fertility is at the same time both much more critical and much more difficult to predict. For this reason,

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[1]Dominica, Grenada, St. Lucia, St. Vincent and the Grenadines.

[2]Antigua, Bahamas, British Virgin Islands, Montserrat, St. Kitts/Nevis, Turks & Caicos Islands, plus the Netherlands Antilles and the US Virgin Islands.

while most projections use only one set of mortality assumptions, it is usual to have as many as three different fertility assumptions. In United Nations (1982) and United Nations (forthcoming), fertility assumptions in the form of gross reproduction rates (GRRs) were made for medium, high and low variants, differing in the length of time needed for these rates to fall to 1.0.

United Nations (forthcoming) estimates the GRR applicable for the first quinquennium 1980-1985 at 1.1 for Barbados, and somewhat higher 1.3 to 1.8 for the remaining countries. The GRR for Guyana is given as lower than that of Trinidad & Tobago, no doubt because of the over-estimate of the 1980 population for the former country. For the medium variant, it is assumed that a GRR of 1.02 would be achieved in Barbados by 1990-1995, in Guyana by 2000-2005, and in the remaining Commonwealth Caribbean countries by 2010-2015, and that this level of fertility would hold for the remainder of the projection period (to 2025). For the high and low variants, it is assumed that the GRR of 1.02 would be achieved 5 years later and earlier respectively.

The fertility of the Caribbean as a whole, except for Haiti and the Dominican Republic, is quite low as compared with most of the other countries of Latin America. Only Suriname and Panama in Latin America have GRRs approaching those of the Commonwealth Caribbean.

The Bouvier projections are for a 50-year period from 1980 to 2030. For all countries he produced one set of projections on the assumption that there would be no decline in fertility; in other words the current total fertility rate (TFR) would continue to 2030. He made one (or two) additional

projections assuming some decline in fertility during the first 10 years (until 1990) and thereafter no further decline. For Barbados, for example, he assumed a decline of 10 per cent to 1990; for Antigua/Barbuda, St. Lucia and St. Kitts/Nevis he assumed a decline to replacement level - a TFR of 2.1 - by 1990. For the last two countries he prepared a third set of projections on the assumption of a somewhat smaller fertility decline. He also investigated the results of an increase in the TFR of Barbados from 1.7 to 2.4 children per woman.

For the Caribbean, net migration is also a critical component of growth which is difficult to predict. As UN (1982) states: "Since international migration is affected to a great extent by social, economic and political circumstances in the countries of origin and destination, anticipating future trends in migration is a particularly precarious task. Migration trends may change dramatically, even reversing themselves, in relatively short periods of time." Despite this, the United Nations projections, like most other projections for the Region, make provision for only one migration assumption, that is that migration will decline.

In the UN (1982) and UN (forthcoming) projections it is assumed that net emigration from the Commonwealth Caribbean will decline rapidly in all countries and will reach zero in Barbados by 1990, in Trinidad & Tobago and the Windward Islands by 2000 and in Jamaica by 2015.

The Bouvier projections, on the other hand, make provision for three migration projections in Barbados, St. Lucia and St. Kitts/Nevis. In these countries which have been experiencing appreciable, the assumptions on migra-

tion are: (a) that migration continues at its 1980 level; (b) that from 1980 onwards migration is halved and remains at the level; and (c) that migration is zero from 1980 onwards. In Antigua where migration was negligible around 1980, two migration assumptions are entertained, one that migration will be zero and the other that there will be a small emigration of 250 per year.

The Projections

The United Nations projections include three variants - high, medium and low - corresponding to the three fertility assumptions. The medium variant of UN (forthcoming) projects that the population of the Commonwealth Caribbean which was 5.3 million in 1980 will increase to 6.9 million in the year 2000 and 8.5 million by 2025 (see Appendix A). The rate of increase declines, according to this variant, from 1.4 per cent per annum in the first decade 1980-1990 to 0.9 per cent for the period 2010-2025. The rate of increase over the whole period does not vary much from country to country. It is least for Barbados (0.9 per cent per annum) and Trinidad & Tobago (1.0) and highest for Belize and the Windward Islands[1] (1.3).

The population in the year 2000, according to the low and high variants respectively, is projected, for the Region as 6.6 and 7.2 million as

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[1]The component method of projection has been used only for Jamaica, Trinidad & Tobago, Barbados, Guyana, and the Windward Islands as a group. For the other countries, as well as for the separate Windward Islands all with a population of under 250,000 in 1980, projections were made for the total population only by applying assumed rates of growth.

compared with 6.9 million according to the medium variant. At 2025, the high, medium and low variants give populations for the Region as 9.4, 8.8 and 8.3 million respectively.

According to these projections, therefore, the prospects are that the population of the Commonwealth Caribbean will increase at a modest and declining rate into the 21st century. By the end of the first quarter of the century the rate of increase (according to the medium variant) will be less than 1 per cent for all countries, and as low as 0.6 per cent per annum in Barbados.

Indeed, as has been shown earlier, Barbados and the Windward Islands except for St. Lucia and St. Vincent, all experienced rates of growth of 0.5 per cent or less in the last inter-censal period, while there was not growth in Belize and negative growth in the Leeward Islands. The rate of growth into the 21st century is therefore likely to be much less than that projected by UN (forthcoming). This, of course, will be the case if migration continues at anything like the rate in recent decades rather than at the much lower rate assumed in these projections.

Further, in long-range projections prepared earlier, UN (1978) projected that the population of the Caribbean islands (not only the Commonwealth Caribbean), which was estimated at 30.6 million in 1980, could attain zero population growth in the mid 21st century. The high variant projected a stabilization of the population at 68 million around 2070, while according to the low variant by 2040 the population would stabilize at about 54 millions (quoted in Guengant (1984)).

The prospects for the 21st century, therefore, are that the Caribbean will have firmly entered the phase of slow or zero population growth brought about by primarily a declining fertility rate. The essential point of these projections is that the fertility decline which began in the 1960s must continue. As indicated earlier this cannot be taken for granted. The projections should, therefore, be of the nature of a spur to policy makers to maintain and even increase their efforts to encourage a further decline in fertility, mainly through continued and increasing contraceptive use.

As compared with the modest rate of growth of the population projected up to the end of the first quarter of the 21st century, the projected change in age-structure is substantial and there are appreciable differences between countries in this regard. In 1980, because of their earlier and larger decline in fertility, Barbados and Trinidad & Tobago had a much lower proportion of children under 15 years of age in their populations - 29 and 34 per cent respectively - than Jamaica and the Windward Islands (41 per cent). This proportion is projected to decline for all four countries[1] but much more rapidly for Jamaica and the Windward Islands so that by 2025, this age is projected to comprise only 20 per cent of the population of Barbados and 22 per cent of the other three populations according to all 3 UN variants.

The aged - persons 65 years and older - who in 1980 comprised a larger proportion of the total in Barbados (9 per cent) than in the other 3 countries

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[1]For convenience the Windward Islands are referred to here as a country.

(5 per cent) is projected to increase in all countries, to 14 per cent in Barbados, 11 per cent in Trinidad & Tobago and 9 per cent in the Windwards and Jamaica. The proportion of the population who are of working age - 15-64 years - is projected to increase substantially in Jamaica (by 16 percentage points) and the Windward Islands (by 14 percentage points) as compared with 4 and 6 percentage points respectively for Barbados and Trinidad & Tobago. As a result, the two former countries which had a lower proportion in this age group in 1980 (54 per cent as against 61 per cent in Jamaica and the Windwards) are projected to have a higher proportion in 2025.

These changes in age structure are mainly the result of the projected declines in fertility and migration. Since the emigrants are predominantly young adults, if migration remains at the level of the 1970s instead of declining rapidly as UN assumes, the population of working age would be smaller and the youth and the aged will be appreciably larger than is projected.

Some change in the sex ratio is also expected, with males forming a somewhat larger proportion of the total in the next century than they do in 1980. Except in Trinidad & Tobago where there were almost equal numbers of males and females in 1980, the sex ratio in the Region was about 95-96 males per 100 females, except in Barbados where it was only 91. According to the projections, the sex ratio in Barbados would be 95 by 2000 and will improve slowly thereafter. In the rest of the Region the sexes will be fairly balanced by the end of the present century. The higher life expectancy of women contributes to a surplus of women in the population, and this will con-

tinue. The projected reduction in this excess results from the assumed reduction in emigration which, in some countries, has been male-selective.

The projected changes in age-structure are likely to have significant impact on the population-related problems of the Region. The decline in the proportion of young persons under 15 years old will mean a notable lessening of the problem of meeting the school needs of the population. In the case of Jamaica where there is a projected decline of 10 per cent in the actual numbers of children 0-14 years of age, both the required number of school places and the number of teachers, for example may fall. Indeed this is already being experienced in some countries in selected, particularly rural, areas. It has been convincingly argued UN (1956) that a rapid growth in the school age population, which accompanies a high or increasing birth rate, is a severe deterrent to economic development because of the diversion of resources from production to meeting the school and other needs of the young that must be undertaken. In theory at least, therefore, the declining child population in the Caribbean should be a boost to economic development in the Region.

By the same token, the increasing working-age population is an economic boom to the countries of the Region in that the dependency ratio will fall appreciably and, once again, a declining proportion of production will have to be diverted to consumption by the non-working population. However, in a Region where one of the gravest socio-economic ills is the high and resistant level of unemployment and under-employment, the fact that the population of working age, and hence the size of the potential labour force, is the most

rapidly increasing segment of the population and will more than double in the next 40 years cannot be seen as an advantage. It is, nevertheless, true that the burden of the labour problem will be considerably less than it would be if the high population growth and, particularly, high fertility rates were to continue. To the extent that the level of emigration remains higher than is projected the situation would be further improved.

The author has argued elsewhere (see Harewood (1978)), that full employment is not achievable in the Caribbean in the foreseeable future. This view must be strengthened by the prospect of the population of working age more than doubling in the next 40 years.

If we consider projections not as an attempt to predict the future population but rather to indicate the implications of different levels of fertility and migration, the Bouvier projections for Barbados, St. Lucia and St. Kitts/Nevis are particularly useful (Appendix B).

On the assumption of a continuation of the current levels of fertility and migration the future growth of these three countries are completely different. In the case of Barbados the population increases marginally between 1980 and 1990 from 244,000 to 246,000 and thereafter declining at an increasing rate to 243,000 in 2000 and 187,000 in 2030. In St. Kitts/Nevis the population decline begins immediately and again becomes more rapid, falling from 43,000 in 1980 to 28,000 in 2030. The position for St. Lucia is completely different, the population nearly triples between 1980 (120,300) and 2030 (342,000). Once again the rate of change accelerates, the increase between 1980 and 1990 being 20,000 while that between 2020 and 2030 being as high as 74,000.

These dramatic differences in population change emphasise the differences in the current levels of fertility and migration in the countries. In Barbados there is a very low fertility and moderate emigration; in St. Kitts/Nevis there is moderately high fertility and huge emigration; but in St. Lucia there is relatively high fertility and only moderate emigration (Guengant - op.cit).

When the current level of fertility is maintained but zero migration is assumed, the importance of emigration is well demonstrated. In contrast to the decline in population in Barbados, the population increases by more than one-third between 1980 and 2030. The population of St. Lucia in 2030 would be 85 per cent higher than under the assumption of continued net emigration. But the most spectacular difference is for St. Kitts/Nevis where instead of declining to 28,000 the population in 2030 would be 2 and 3/4 times as large.

Many other 'scenarios' can be obtained for each country by different combinations of the assumptions of fertility and migration with the single mortality assumption. Those for Barbados which are included in Bouvier (1983) are given in Appendix B, and indicate the range of projections that result from these assumptions.

The various scenarios show that the age-sex structure of the population, and hence the nature of the population problems facing a country can be widely different depending on the future trends of fertility and migration. Comparing St. Kitts/Nevis and St. Lucia, for example, in which the aged population 65 years and older comprised 6 and 10 per cent of the total respec-

tively in 1980, if the present fertility and migration levels continued, by 2030 the aged would be about the same proportion in St. Lucia but would comprise 1 in 4 of the total population of St. Kitts/Nevis. At the other extreme for this latter country, if the fertility level continued but there was no further emigration, the proportion of the population which is aged 65 and over would decline to 7 per cent by 2030.

In all projections for all countries there is some aging of the population as the proportion aged 15 and under declines. Where there is a large increase in the proportion aged 65 and over there might appear to be a chance of an appreciable reduction in the problems relating to unemployment and underemployment as the size of the labour force will decline appreciably. In Barbados, for example, if the current levels of fertility and migration were maintained, the labour force is projected to decline from 104,000 in 1980 to 83,000 in 2030. But, of course, this would imply very serious problems of an aging population to which the Region has up to now paid no attention.

The Bouvier projections, which are clearly intended as illustrations or scenarios as he calls them, and not predictions of the population in the 21st century, are useful in emphasising that the population growth and population problems may differ quite appreciably for the different countries of the Region. They also clearly demonstrate the need for population policy and population planning to pay especial attention to migration as well as to fertility, and for serious and continued research aimed at achieving a full understanding of the implications of future changes in these two components of growth.

Some Observations on Mating and Fertility

Of the two components of natural increase - mortality and fertility - the latter is by far the more important for projecting population. At the same time, it is extremely difficult to forecell future trends in fertility, partly because of the many demographic, social and economic factors known to influence or at least be associated with fertility, and partly because it is clear that fertility is affected to a much greater extent by factors other than those normally taken into account in fertility studies.

For these reasons, assumptions about the future direction and rate of change of fertility must be based, like UN (1982), on a subjective assessment of past and current fertility trends, trends and anticipated changes in "the socio-economic structure and cultural value systems", and policies and programmes directed towards family planning.

We discussed fertility trends very briefly earlier. We now summarise some interesting information on fertility trends, fertility differentials, mating patterns and contraceptive use obtained from recent surveys in the Region which contributes to an understanding of and hence to our ability to anticipate future trends in fertility.

The main source of these new data are the Fertility Surveys carried out in Guyana in 1975, Jamaica in 1975/76 and Trinidad & Tobago in 1977 under the aegis of the World Fertility Survey (WFS), and more particularly special analyses of the data from these surveys carried out by Singh (forthcoming), Abdulah and Harewood (forthcoming), Lightbourne (forthcoming) and Harewood

(forthcoming). Additional recent information, more specifically on family planning, has also been obtained for Barbados, Antigua, Dominica, St. Lucia and St. Vincent in Contraceptive Prevalence Surveys carried out in the period 1980-1982 (see References).

The discussion in this Section is based on these analyses and reports. Cohort measures of fertility from the Fertility Surveys confirm that there has been a delcine in fertility during the 10 years preceding the survey and, that the decline was greatest for Trinidad & Tobago.

The surveys also confirm the usual pattern of fertility differentials (Singh (forthcoming)), that is that women with middle and upper class characteristics and women whose partners had such characteristics - better education, white collar occupations, urban residence and, in the case of the women, employment before first birth, for example - have fewer children on average than women with lower class characteristics. But these differentials have been increasing, particularly in the period that fertility has been declining. This must mean that the fertility decline has been greatest among those women who already had a relatively low fertility; in other words, the women with upper and middle class characteristics are also the leaders in the further decline in fertility. A noteworthy exception to this pattern has been that in the case of Trinidad & Tobago (only) urban-rural differentials have largely disappeared. This is indicative of the fact that when the fertility of middle and upper class women reaches a critical level and either stops declining or continues to decline at a much reduced rate, further fertility decline for the population as a whole must result from a relatively more

rapid decline of fertility among lower class women, hence fertility differentials will be reduced and could eventually disappear. The disappearance of urban-rural differentials in Trinidad & Tobago may, therefore, herald a decrease in heterogeneity for all socio-economic factors in that country and, in due course, in the other countries as well.

Of the background (demographic and socio-economic) variables used in the analysis[1], education has been found to be by far the most significantly associated with fertility in that the differentials persist after all the other factors are held constant. On the other hand, in the case of the other background variables, the differentials are appreciably reduced or entirely disappear when the remaining variables, more particularly education, are held constant.

Another significant and interesting finding in the analysis of fertility differentials is that the relative importance of the different background characteristics has changed from older to younger cohorts: among older cohorts fertility was more significantly related to the partner's achieved characteristics - his education and occupation - than the achieved characteristics of the woman herself. For the youngest cohort this has

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[1]The variables used in the Singh analysis are:

(a) age at entry into first union, residence status, respondent's religion, respondent's education;

(b) number of partners, current union status, respondent's occupation, whether worked before the first birth or pattern of work;

(c) partner's education, partner's occupation.

changed and it is the woman's own achieved characteristics - her education, occupation and pattern of work - that are the more important. This no doubt reflects in some measure, the more rapid improvement in the education of women in recent years, and more generally the improved status and self-awareness of women. The relationship between these factors and fertility is further attested by the fact that the enhanced significance of the woman's characteristics occurred first in Trinidad & Tobago where the fertility decline first began.

It is generally assumed that the decline in fertility has been associated with a reduction in the number of children women want to have. Indeed, Harewood (forthcoming), comparing the 1977 Fertility Survey with an earlier 1970 Survey for Trinidad & Tobago found that while the ideal family size for most women at both surveys was four children, at the later survey the proportion wanting less than 3 children had increased. He attributed this to the rising level standards, greater exposure to more advanced, low-fertility societies through television, overseas travel, advertisements etc., and generally to increasing 'modernisation'. But Lightbourne (forthcoming) in his special analysis of fertility preferences based on the Fertility Surveys, found no evidence that the number of children that women want for themselves has declined and, on the contrary there appeared to have been some increase in the number preference in Jamaica between 1956 and 1975/76. At the same time, the surveys for the three countries all indicate a substantial increase in contraceptive use. These inter-survey comparisons must, of course, be treated with caution, but if the findings are correct, then the increased

contraceptive use would have contributed to a decline in fertility mainly through reducing unwanted pregnancies. Since the incidence of unwanted pregnancies is still high, further declines may be achieved without any change in desired family size, by continued or increased contraceptive use.

On the other hand, the contraceptive study (Abdulah and Harewood) has shown that many of the women practising contraception were doing so to postpone (or space) births rather than to avoid any future birth. It is therefore likely that current fertility will increase at higher ages for the current cohorts, and the completed fertility of these women may not be as low as might be expected in the light of the fertility declines observed.

In the case of Trinidad & Tobago and Jamaica, the striking increase in contraceptive practice which started earlier was speeded up by the introduction of national family planning programmes in the latter half of the 1960's, which combined the earlier voluntary programmes with official programmes. But despite the earlier and more aggressive programmes in Jamaica, contraceptive use is much higher in Trinidad & Tobago - 60 per cent as against 45 per cent. Use is much lower in Guyana - 39 per cent among Indians and 35 per cent among non-Indians - where there is no official support for, and indeed some opposition to, birth control.

The ordering of the three countries with regard to contraceptive use is also the same as the ordering as regards level of development, the GDP for Trinidad & Tobago (US $3,117) being twice that of Jamaica (US $1,554) which in turn was nearly 3 times as large as that of Guyana (US $540).

The most popular contraceptive method was the 'pill', being used by about one-third of all contraceptors in each of the countries. Female

sterilization was the next most popular method in Jamaica and Guyana (29 and 21 per cent respectively), but only 8 per cent of the users in Trinidad & Tobago had been sterilized. This is partly the result of the fact that the sterilization programme in this country is low-keyed. In all countries, however, sterilization is more popular among lower-class than among middle and upper class women.

Abdulah and Harewood used the Bongaarts approach (see References) on the Fertility Survey data to obtain a measure of the contribution on contraceptive use to the fertility decline. On the basis of data for the year preceding each survey, it was found that the three intermediate variables used in the model - celibacy, contraceptive use and post-partum infecundability - resulted in a lowering of the total fecundity rate (i.e. the total fertility rate that would have existed if none of these three inhibiting factors were in effect) by between 58 and 75 per cent for Indians and non-Indians of Guyana and Trinidad & Tobago and for Jamaica. In each population contraception had the greatest inhibiting effect of the three, the relative effect being higher for Trinidad & Tobago non-Indians (56 per cent) than for the other populations (39-43 per cent).

The Fertility Surveys provided valuable information on the relative importance and stability of different sexual union types, and this is the subject of study of Harewood (forthcoming). Because of the important differences between Indians and non-Indians in this regard, these two ethnic groups have been studied separately for Guyana and Trinidad & Tobago where Indians

form a large proportion of the total population. The remarkable findings of this study relate to the important changes in mating that have occurred during the past two decades, both within and between the ethnic groups.

Three types (statuses) of sexual unions have been used in the Fertility Surveys as in earlier demographic surveys:

(a) *marriage*, in which a man and woman are *legally* married to each other and living together in the same household;

(b) *common law unions*, in which a man and woman live together as man and wife but are not legally married to each other;

(c) *visiting unions*, in which a couple do not live together in the same household but have a regular sexual relationship.

Looking first at the mating patterns of older women in the surveys, the two principal differences between Indians and non-Indians are: (a) that Indians entered their first relationship at a younger age; and (b) that most Indians (about 90 per cent) first entered legal marriage, while the majority of non-Indians (60-70 per cent) first entered a visiting relationship. In Guyana and Trinidad & Tobago more non-Indian women first entered legal marriage than a common law relationship; the reverse was true in Jamaica.

Among non-Indians the common law relationship is predominantly a lower class type. Women who entered a visiting relationship at an early age began to shift to one of the other two types or to the single state within a relatively short time. In Jamaica most of them shifted to common law while in the other two countries most shifted to legal marriage. Because of these shifts most non-Indian women have had two or more relationships, often changing union type with the same partner, but a large proportion also have had two or more partners.

In recent years, and more particularly among young persons in the 10 years or so preceding the surveys a number of important changes in mating patterns have occurred. Among women under 25-30 years of age non-Indians now enter their first relationship at an earlier age than Indians unlike the earlier pattern. Also, while the proportion of women ever in a union was formerly slightly lower for non-Indians than Indians the reverse is now true and significantly fewer Indians have entered a union at each age. As a result of these changes, the average age at first entry is now less for non-Indians than for Indians in Guyana and Trinidad & Tobago. In Jamaica on the other hand, the recorded mean age at first entry has declined significantly though it is believed that to some extent this is because of older women over-stating their age at first union.

In all five populations more women now enter a visiting relationship. Among non-Indians this follows a tendency for more better educated women to enter this union type; it is also associated with the lower age at entry into a first union. While the proportion of Indian women entering a visting relationship is still small as compared with the proportion of non-Indians, the proportion has become quite large in Trinidad & Tobago. Here by age 20 the proportion of Indians under 30 years of age who had entered a visiting relationship was about 20 per cent as compared with 14 per cent of those currently aged 40-44. This proportion for young women in Trinidad & Tobago was also very much higher than for Guyana Indians, only 8 per cent of young women under 30 years of age having entered a visiting relationship.

The rapid increase in the case of Trinidad & Tobago no doubt stems from the rapid spread of secondary education to all parts of the country which has particularly benefited Indians who are predominantly rural, and more particularly Indian girls among whom the proportion attending secondary school used to be very low. In the context of Trinidad & Tobago the trend towards entering a visiting relationship is an indication of a significant breakaway on the part of young Indians from their traditional life patterns.

This is a convenient point to draw attention to another aspect of the 'modernising' of Indian women. There was a popularly held view, until recently, that the practice of control would not be adopted by the Indian population of the country because of their conservative outlook. For this reason, it was believed, the fertility differentials between Indians and non-Indians would increase as that of non-Indians fell rapidly with the increasing practice of contraception while that of Indians remained high.

The Fertility Surveys show that in Trinidad & Tobago contraceptive use was equal among Indians and non-Indians - 60 per cent of exposed women were current contraceptors - while in Guyana use was slightly higher among Indians - 39 per cent as against 35 per cent for non-Indians. The higher use by Indians in Guyana is explained by the much higher incidence of sterilization in this sub-population. Since sterilization is irreversible, contraceptive use by older women (40 years and over) is relatively very high for Indians. With the reduced risk of pregnancy at this age the effectiveness of use by Indians is somewhat less than appears. There is no difference in the incidence of sterilization in Trinidad & Tobago. On the other hand, since

contraceptive practice increases with education and the level of education is still somewhat higher for non-Indians, use by Indians is higher for both countries even when sterilization is excluded.

It is not surprising, therefore, to find that the fertility of Indians has been declining appreciably in recent times. The mean number of children ever born, which is the principal cumulative measure of fertility from the surveys, show a somewhat larger fall for non-Indians in early fertility (i.e. in the first 10 years of marriage duration) but the decline is greater for Indians for late fertility (in the second 10 years).

The current fertility measures show a much larger decline for Indians than for non-Indians. Thus, in the year preceding the survey, the total fertility rate, according to the survey data, was lower for Indians in both countries. Using data from other sources Harewood (forthcoming[1]) found that between 1960 and 1970, in Trinidad & Tobago the total fertility rate of Indians fell very much more than that of non-Indians (41 per cent as against 29 per cent), the rates at that time being about the same for the two ethnic groups - 3.8 for Indians and 3.5 for non-Indians.

We conclude this section with a brief reference to findings from contraceptive prevalence surveys in the period 1980-1982 in Barbados, Antigua, Dominica, St. Lucia and St. Vincent (see References). In the light of the successful family planning programme in Barbados already referred to, it would be expected that the level of contraceptive use in that country would be

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[1]In Barbados (only) the base population is not all 'exposed' women but women 'in union and non-pregnant'. In the other countries women known to be infecund were also excluded from the 'exposed' female population.

among the highest in the Caribbean. But the proportion of exposed[1] women currently using contraceptives in Barbados in 1980/81 (48 per cent) was about the same as in Antigua and in Jamaica (in 1975/76), and was much less than in the other countries except Guyana. Most surprising of all, St. Lucia which still has a very high current fertility rate reported a higher level of use (52 per cent) than Barbados with its very low level of fertility. Equally surprising is that the proportion of exposed women reported as contraceptors was higher for Dominica (62 per cent) than for Trinidad & Tobago (60) four years earlier.

Given these figures it would be unwise to use the data from the Contraceptive Prevalence surveys to compare the level of contraception in the different countries. One could at least say, however, that the level of use appears to be quite high in the Region as a whole.

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[1]In Barbados (only) the base population is not all 'exposed' women but women 'in union and non-pregnant'. In the other countries women known to be infecund were also excluded from the 'exposed' female population.

Perspectives for Food and Nutrition

The relationship between the size of a country's population (or its rate of growth) and its total available food supply (or rate of growth of this supply) has always attracted attention. In the period of very rapid growth of the world population after World War II, demographers and students of population used this Malthusian relationship to dramatise the need for a reduction of the rate of population growth. This relationship does not have the simple and direct impact on the welfare of the population in terms of the level of nutrition as might be expected. Indeed Gurney (1981) found no correlation between protein energy malnutrition (PEM) and the national food supply in the Caribbean. The relationship is, nevertheless, fundamental: if population doubled while the absolute supply of food did not increase, there must be a serious deleterious effect on nutrition. And the existing situation is already very serious. CARICOM (1981) refers to a recent study which estimates that about 44 and 56 per cent of the population do not obtain minimum recommended levels of protein and calorie requirements respectively.

Given the projected population growth in the Caribbean, there should be an increase in total food supply in the Region of about 1/3 by 2,000 and nearly 2/3 by 2,025 to match the expected growth in population, in order to maintain the current level of nutrition, all other things being equal, of course. Since there is an expected relative increase in the adult

population, and since the food intake of adults is greater than that of children, the increase in total food supply should be somewhat larger than the increase in total population. On the other hand, the slow down in the rate of growth of children, consequent on the falling fertility rate, should contribute to some reduction in their level of malnutrition. Indeed, Gurney (op. cit) found that PEM of infants and young children has already been declining in most countries of the Region in the 1970s.

Other demographic factors have been found to be related to nutrition in the Caribbean. For example, Gurney (op. cit.) noted that both Guyana and Trinidad and Tobago showed a worse nutritional status in the 1970s than would be expected when compared to the rest of the Caribbean. He considered that one contributing factor might be ethnic mix in these two countries, both of them having a large East Indian population. It is generally believed that the dietary habits of this ethnic group, related to their culture and history, might contribute to some relative nutritional disadvantage.

But another demographic variable might be involved. Gurney (op. cit.) pointed out that in Jamaica, which is to a large extent ethnically homogeneous, children in rural areas are under-weight - the indicator of malnutrition here - as compared with urban children. Moreover, the urban-rural pattern is similar in Guyana. Since Indians are predominantly rural in Guyana and Trinidad and Tobago, Gurney feels that much of the ethnic differential in nutrition might reflect the residence differential.

A number of non-demographic factors may also significantly affect the relationship between population, food supply and nutrition. A reduction in food waste, an improvement in food conservation, a more equitable food (and income) distribution, the control - probably through subsidy - of the prices of essential foodstuffs, more widespread knowledge of food values and food preparation are among the many factors could lead to an improvement in the nutritional level of the Region as we approach the 21st century.

The prospects for future food production is mainly the concern of the specialists in agriculture. In the Caribbean, however, the food supply is not entirely or directly related to agricultural output. This is because traditionally, the Region's agriculture has not been devoted to producing food for the local population, but to producing items for export to developed countries - sugar, cocoa, citrus, coffee, bananas etc. Traditional agriculture, therefore, along with petroleum (Trinidad), bauxite (Jamaica and Guyana), tourism (most countries) and other foreign exchange earners provide the source for our importation of much of our food along with other non-local products. But the agricultural sector also has a direct and important impact on food supply through the domestic food production sector.

But neither the traditional nor the domestic food production sectors of agriculture have been performing satisfactorily. From a region which has traditionally earned most of its foreign exchange from agriculture, in the last decade the Caribbean became a net importer of food and agricultural products. The food import bill alone now exceeds US$ 600 million per year.

Much attention and lip service has been given in the region to the need to increase agricultural production, especially the production of food for the domestic market in the light of the declining market for the principal agricultural export - sugar - and the worsening terms of trade for the other staples. There is little evidence of any improvement, however, and on the contrary the situation has been worsening. (See CARICOM (1981)).

The projected population growth for the remainder of the present and the early part of the next century must be used, with all other possible means, to galvanise the regional organizations, the governments and the peoples of the Region to "realise its substantial potential for contributing to economic development" and, most important, to make its full contribution to the feeding of the people of the Region and the reduction of malnutrition among its peoples.

Conclusion

The review of mating and fertility does give some indication of their likely trends into the twenty-first century. As regards mating, it seems very likely that the trend to greater entry and participation in non-cohabiting visiting relationships will continue. In particular, in Trinidad and Tobago and to a lesser extent in Guyana this union type might become more popular among Indians. In all countries the likelihood is that with increasing independence of women the incidence of visiting will increase. The fertility surveys clearly indicated that women who first enter a visiting relationship tend to have fewer children even when they soon shift to one of the other two types. Similarly women currently in a visiting relationship had fewer children than those currently common law married. It seems likely, therefore, that the changing mating pattern may contribute to a further decline in fertility.

Given the increasing contact of the people of the Region with the low fertility populations of the more developed countries - USA, Canada, UK, and others - the trend to increasing contraceptive use may be expected to continue.

The expected increase in population implies the need for an equivalent total food supply to maintain present levels of nutrition. But there is, at present, serious malnutrition problems and an even greater increase in food supply might be necessary. On the other hand there is

ample opportunity to improve the level of nutrition with the available food by better distribution, preservation and use and reduced wastage. In any case there is urgent need for the agricultural sector of the Region to increase considerably their domestic food supply.